REMARKS

Applicants have now had an opportunity to carefully consider the Examiner's comments set forth in the Office Action of December 16, 2005.

The Office Action

Claims 1-52 were presented for examination.

Claim 33 stands rejected as being anticipated by Stava ('049).

Claims 1-32 and 34-52 stand rejected under the combination of Stava ('049) and Hutchison et al. ('626).

Claims 2-4, 29-31, 34-36, 41-43, 46-and 51 are requested to be canceled herein.

The Remaining Claims Distinguish Over the Cited Art

Independent claim 1 has now been amended to more particularly recite the improvement to the electric arc welder includes the first waveform generator having a circuit to generate the first waveform controlled by a current control signal, and the second waveform generator having a circuit to generate the second waveform with a generally constant arc parameter, controlled by a constant voltage signal or a constant wattage signal. Claim 1 also now recites the first and second waveform generators are configured to operate in a generally sequential fashion with respect to each other.

It is submitted the above amendments distinguish claim 1 from the cited combination of Stava '049 and Hutchison et al. '626. More particularly, it is argued in the Office Action Hutchison et al. teaches "constant parameters" being applied during an arc portion of a short-circuiting process. It is stated this concept is shown in Figure 3 of Hutchison et al. The "constant parameters" are considered, in the Office Action to be voltage and current. It is also argued that since voltage and current are constant, power is also constant.

Applicant has reviewed Hutchison et al. and the discussion related to Figure 3. It is respectfully noted Hutchison et al. is directed to a control scheme which, uses a current command signal to drive the output current. The command signal is comprised of multiple components. One component sets the long-term current command level (called the long-term current command). Another component adjusts the current command on a real-time or short-by-short basis (called the short-by-short current command). An arc voltage

feedback is used to determine if the desired arc length is present and to adjust the long-term command. The short-by-short current command is derived from real-time arc current feedback (rather than power), and is used to control the burn-off rate of the instantaneous, or short-by-short adjustment of the current command (see col. 5, lines 55-67).

As also described in the '626 patent, T_{hld} represents an arc condition that begins at the end of the short clearing. The current is commanded to a level high enough to melt the end of the wire during T_{hld}. T_{hld} is maintained for a duration long enough that a desired amount of heat (or energy) is input into the wire (see col. 7, lines 6-10).

Thus, Hutchison teaches that in the arc portion of the welding process, a current control waveform is used.

Therefore, while Figure 3 illustrates current and voltage outputs, the flat voltage output exists only due to the use of a current control signal, and does not teach application of a constant voltage or wattage control signal during an arc portion of the welding cycle. Hutchison et al., particularly, does not teach the now claimed second waveform generator which controls a portion of the welding cycle by a voltage or wattage control signal, where another portion of the welding signal generated by a first waveform generator is controlled by a current control signal and both are configured to operate in a non-overlapping sequential fashion (see page 9, lines 6-14).

Use of the voltage or wattage function to control the arc condition in the short circuit welding process permits for precise control of the weld puddle during the welding procedure and operation in the voltage range of the power supply. Particularly, by adjusting constant voltage 42, the temperature and/or fluidity of the weld puddle is controlled. For at least these reasons, independent claim 1 is distinguished from the cited art.

As dependent claims 5-28 and 31 depend from and further define this claim, it is submitted these claims are also distinguished.

Independent claim 33 is rejected as being anticipated by Stava '049. In particular, Figures 1 and 4 are cited as showing the concepts of a first slope, a break point and a second slope. Applicant acknowledges the disclosure in Figures 1 and 4. However, claim 33 has also now been amended to more particularly recite distinguishing features of independent claim 1. Independent claim 30 recites a first current controlled waveform

which operates during a short circuit condition, and a second constant voltage controlled waveform which functions during the arc condition. Also provided is a first waveform generator which constructs the first waveform, and a second waveform generator which constructs the second waveform. As discussed in connection with claim 1, Stava '049 (alone or in combination with Hutchison et al.) does not teach or fairly disclose the concept of using a constant voltage waveform to control a portion of the welding cycle. For at least these reasons, it is respectfully submitted claim 33 is distinguished.

As claims 37-40 and 44,45, 49 depend from and further distinguish this claim, it is submitted they are also distinguished.

Independent claim 50, includes the concepts of the first waveform, having a first slope, a break point and a second slope. The claim goes on to recite elements for setting the breakpoint via a first manually adjustable input signal and a second manually adjustable input signal, such as, for example, disclosed in Figure 12. It is argued that column 8, lines 1-40 of Hutchison et al. discloses the use of two different slopes for short circuit waveforms, and the slopes are determined by the controller. It was considered by the Office Action to be obvious the two slope values of Hutchison et al. '626 would be adjustable in some manner. Applicants respectfully submit that even if the slopes of Hutchison et al. would be adjustable by a controller, claim 50 provides for a specific configuration not taught or fairly considered by this reference. In particular, in accordance with the concepts of Figure 12, a switch 660 is provided to allow a user to select from one of a plurality of parameters which may be used in order to determine from where the breakpoint value (32b) is provided. In particular, in Figure 12, the parameter to adjust the set point may be the voltage output (or other parameters, such as wire feed speed). It is submitted the position stated in the Office Action that Hutchison et al. '626 would somehow control the slopes of the waveform does not teach or fairly suggest the concepts of claim 50, that the break point can be selected from among different parameters in the circuit. For at least these reasons, it is respectfully submitted claim 50 is distinguished from the cited art.

It is noted that claim 52 recites one particular parameter as being a voltage input.

For the above-noted reasons, it is respectfully submitted these claims also are not taught by the cited art.

CONCLUSION

For the reasons detailed above, it is submitted all claims remaining in the application (Claims 1, 5-28, 32, 33, 37-40, 44, 45, 49, 50 and 52) are now in condition for allowance. An early notice to that effect is hereby earnestly solicited.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to call Mark Svat, at Telephone Number (216) 861-5582.

Respectfully submitted,

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